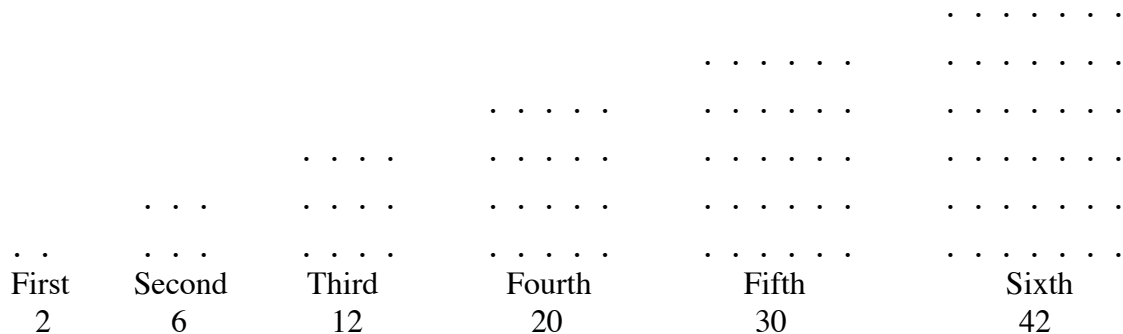


**For each question, you need to find the answer and show your work. For some problems, you may just need to write out how you know you have the correct answer.**

The set of figures below represents rectangular numbers. The first rectangular number is a rectangle 2 units long by 1 unit tall. Use this set of figures to answer Questions 1 and 2.



1. In each figure, the height (the shorter side) is represented by  $n$ . Write an expression that represents the length. Then write an expression that represents the number of dots per term.

2. Determine whether the sequence is arithmetic, geometric, or neither. How did you arrive at your answer?

3. A population of bacteria is tripling every hour. If there are 150 bacteria at 1:00 PM, how many can be expected at 6:00 PM?

4. Write an equation to represent the information in problem 3.

For numbers 5 – 8, determine whether the following are arithmetic, geometric, or neither. Then, state the common difference or common ratio if there is one. Next, determine an equation for the sequence. Finally, find the next four terms of the sequence.

5. 5, 9, 13, 17, ...

6. 3, 12, 48, 192, ...

7. -6, 14, -22, 30, ...

8. 2, -8, 32, -128, ...

9. Matt Mitarnowski swims 15 laps each day during the first week of training. If he increases the number he does each week by three, how many laps will he swim per day during the 10<sup>th</sup> week?

10. On average, the temperature has been dropping 3°F per week. If the average weekly temperature this week is 33°F and the pattern continues, what will the average temperature be 5 weeks from now?

**Open-Ended Question:** You may answer this question on this or a separate sheet of paper. Make sure as you answer the open-ended question that you show your work AND explain how you know you are doing the correct work. **YOU MUST EXPLAIN WHAT YOU ARE DOING!!!**

The first four terms of an arithmetic sequence are 15, 29, 43, 57, ...

- A. What is the common difference?
- B. Find the 18<sup>th</sup> term of the sequence.
- C. What is the sum of the first 18 terms?